Source Water Assessment Program (SWAP) Report For Benjamin Ellis Pre-School

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared: March 27, 2001

Table 1: Public Water System (PWS) Information

PWS NAME	Benjamin Ellis Pre-School
PWS Address	247 Tremont Street
City/Town	Carver, MA
PWS ID Number	4052006
Local Contact	Head Custodian/Certified operator/ Richard Brown
Phone Number	(508) 866-6243

Well Name	*Source ID#*	*Zone I (in feet)*	*IWPA (in feet)*	*Source Susceptibility*
Well #1	4052006-01G	100	416	High

What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

? inventory land uses within the recharge areas of all public water supply sources;
? assess the susceptibility of drinking water sources to contamination from these land uses; and
? publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

INTRODUCTION

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including septic systems, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential contaminant sources, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attachments, including a Map of the Protection Areas

1. DESCRIPTION OF THE WATER SYSTEM

The Well
The Benjamin Ellis Pre-school is a public water system with a single water supply currently serving a population of 91 people. The well is located in a below ground block pit in the playground area west of the school buildings. Well #1 has a Zone I of 100 feet and an Interim Wellhead Protection Area (IWPA) of 416 feet. Please refer to the attached map of the Zone I and IWPA. The public water systems emergency power is provided by propane gas fuel generator. The well is located in a sand and gravel aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration.

The Water Quality
The public water system installed a corrosion control treatment system in the year 2000. Groundwater samples collected from the Benjamin Ellis Pre-School well in the

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.

- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

late 1980s contained volatile organic compounds (VOCs) from an unconfirmed source. The Benjamin Ellis Pre-School is currently monitoring for VOCs on quarterly basis. Samples collected from the well for the second, third, fourth quarters in 1999 and first, second, third quarters in 2000 indicated no detection of VOCs.

The Benjamin Ellis Pre-School has been placed on increased monitoring frequency for nitrate due to detection of nitrate > 5.0 milligrams per liter. Although the maximum contaminant level (MCL) has not been exceeded 310 CMR 22. 06(7) (c state's relevant part, that for all public water systems, their repeat monitoring frequency for ground water system shall be quarterly for at least one year following any one sample in which the concentration is > 50 percent of MCL. MCL for nitrate is 10 milligrams per liter. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1.

2. DISCUSSION OF LAND USES IN THE PROTECTION AREAS

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.
Key issues include:

1. **Inappropriate activities in Zone I;**
2. **Massachusetts DEP oil and hazardous materials incident report #S92-0961**
3. **Two (2) 275 gallon Aboveground Storage Tank (AST) for heating fuel with a floor drain in IWPA in the school basement**
4. **AST for heating fuel in IWPA behind school garage**
5. **Underground Storage Tank (UST) in IWPA**

The overall ranking of susceptibility to contamination for the well is **High**, based on the presence of at least one High threat land use or activity in the IWPA, as seen in Table 2.

ZONE I:

1. **Zone I** – The public water supplier does not own and/or control all land encompassed by the Zone 1. The well does not meet DEP's restrictions, which only allow water supply related activities in Zone Is. The Benjamin Ellis Pre School Zone I contains, a road (Church Street), parking area, school playground and a residence.

   Recommendation:

   ✓ Remove all not water supply activities from Zone I to comply with DEP's Zone I requirements. Please note that systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems.

Table 2: Table of Activities within the Water Supply Protection Areas

Facility Type	Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Gas/service station	Underground Storage Tanks	No	Yes	High	Gasoline, diesel?
School	Floor Drain	No	Yes	High	Heating oil AST is located in the same room as floor Drain
Roads	Catch basin, runoff from road salting & spills	Yes	Yes	Moderate	Church Street in Zone I,Tremont Street in IWPA
School	Parking lot, playgrounds, structures	Yes	Yes	Moderate	playground in Zone I
School	Septic System	No	Yes	Moderate	refer to septic systems brochure in the attachment
School	Fuel Storage Above Ground	No	Yes	Moderate	Two (2) steel tanks in school basement, 1 Steel tank behind school maintenance garage exterior
Residences	Septic system, lawncare, heating fuel storage	No	Yes	Moderate	several residences

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.**

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400 foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone II. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

IWPA:

2. **Massachusetts DEP Oil and Hazardous Materials Incident Report #S92-0961**-A review of Massachusetts DEP oil and hazardous materials incident reports (refer to attachments for copy of incident report) indicates petroleum contaminated soil was encountered during an excavation at the Benjamin Ellis Pre-School on Dec. 30, 1992. Contaminated soil was encountered during a percolation test for a new septic system. An out of service underground storage Tank (UST) was encountered on the site. The DEP files are incomplete as to the actions taken by the Town to address the release. On January 31st, 2001, DEP staff contacted the Town of Carver Fire Department for additional information regarding the release. No additional information was located in the Fire Department records. On Jan. 31, 2001, DEP staff contacted school Department staff in order to obtain additional information. The school staff indicated that the town had hired a contractor to oversee further response actions and those response actions consisted of UST and petroleum contaminated soil removal. The DEP has no documentation in its files regarding response actions conducted by the Town of Carver.

Recommendations :

3 Review town records and/or contact your consultant to locate any documentation as to the response actions conducted at the Benjamin Ellis Pre-School. Provide the Department with a copy of any documentation regarding this release. If you have any questions regarding this request contact Mark Dakers at (508) 946-2847.

3. **Aboveground Storage Tank and floor drain in the school basement –** Two (2) 275 gallon AST with heating oil without secondary containment are located in the basement of the school within the IWPA. The basement floor has several areas that do not have an impervious service.

A floor drain was observed within the basement of the school building in the same room as the two (2) AST's. The floor drain in the school building is primarily a concern due to the storage of heating fuel AST.

Recommendations:

✓ The Department recommends that you provide 110% secondary containment for the AST located in the school basement. Aboveground storage tanks in your IWPA should be located on an impermeable surface. Comply with all provisions of the regulations regarding AST. Any modifications to the AST must be accomplished in a manner consistent with Massachusetts's plumbing, building, and fire code requirements. The Department recommends that you consult with the local fire department for any additional local code requirements regarding AST.

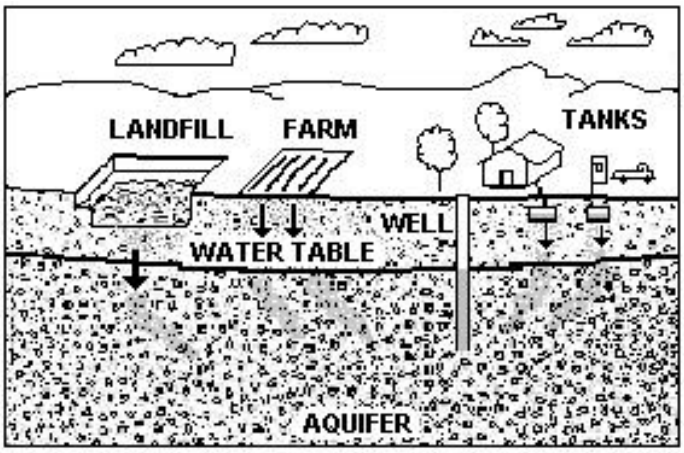

Figure 1: Example of how a well could become contaminated by different land uses and activities.

✓ Bring the floor drain in the school basement into compliance with DEP's Regulations (refer to attachment "Industrial Floor Drain Brochure"). Floor drains in the Zone I and IWPA should be sealed or connected to a sanitary sewer or tight tank.
- Contact the UIC coordinator for the Southeast Region Office of the Department for additional technical assistance (Mark Dakers Tele. #508-946-2847).
- Interim actions: Cease using the floor drain

4. **Aboveground Storage Tank behind Maintenance Garage** - A 275-gallon AST heating oil tank is located behind the garage on the north side of the school. The tank is located outside and does not have secondary

For More Information:

Contact Mark Dakers in DEP's Lakeville Office at (508) 946-2847 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on DEP's web site at: www.state.ma.us/dep/brp/dws.

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been provided to the public water supplier, town boards, the town library and the local media.

containment.

Recommendation:

- ✓ The Department recommends that you provide 110% secondary containment for the AST located behind the maintenance garage. The Department recommends that a roof be placed over the tank to prevent rainwater from collecting within the secondary containment area. Aboveground storage tanks in your IWPA should be located on an impermeable surface must be accomplished in a manner consistent with Massachusetts plumbing, building, and fire code requirements. The Department recommends that you consult with the local fire department for any additional local code requirements regarding AST.

The Benjamin Ellis Pre-School should review and adopt the **key** recommendations above for the potential sources of contamination identified in the Zone I and IWPA.

In addition to the potential sources of contamination identified within the Zone I, there are additional potential sources of contamination in IWPA.

5. **School Septic System**-The school septic system is located approximately 180-ft. south-southeast of the well. The septic system tank and leaching pits are located between the school building and Tremont Street (refer to attachments for more information on septic systems). An application for disposal works construction permit was issued for an individual sewage disposal system at the Benjamin Ellis School on Dec. 15, 1992 (refer to attached) by the Carver Board of Health for a system with a total daily design flow of 1,250 gallons. The Department reviewed septic system plans entitled, " As Built Septic System Plan, the Benjamin Ellis School, Tremont Street, Carver, Massachusetts (Revised 1/7/93)" by Shorey, Nims and Bartlett Inc. Design calculations provided on the plans indicated a total design flow of 672 gallons per day. Additionally, the following note was recorded on the plans; "This is an interim system until such time as the extent of the pollution caused by the ruptured oil tank can be determined and remedial action taken".

   A certificate of compliance was issued on Jan. 4, 1993 by the Carver Board of Health (refer to attached) for the interim system with a design flow of 672 gallons per day according to aforementioned plans. There were no other plans or documentation in the Board of Health files, indicating the "interim system" had been replaced with a permanent septic system.

   Recommendation:

   - ✓ Please provide a certificate of compliance for the sewage disposal system with a total daily flow of 1,250 gallons for the Benjamin Ellis Pre School.
   - ✓ Review school/town records and/or contact your consultant to locate any correspondence regarding the replacement of the "interim system". Provide the Department and Carver Board of Health with a copy of any documentation regarding this matter. If you have any questions regarding this request contact Mark Dakers (508) 946-2847.
   - ✓ Septic system components should be located, inspected, and maintained on a regular basis. Refer to the attachments for more information regarding septic systems.

6. **Stormwater** - There are several leaching catch basins located along a Tremont Street. Catch basins transport storm water from the roadway and adjacent properties to the ground. As flowing storm water travels, it picks up debris and contaminants from streets, parking areas and lawns. Common potential contaminants include lawn chemicals, Health waste, leakage from dumpsters, improperly dumped household hazardous waste, and contaminants from vehicle leaks, maintenance, washing or accidents. Catch basins transport storm water from the parking lot, roadway and adjacent properties to the ground. Pollutants are actually not removed from most catch basins until they are cleaned out. Regular maintenance is required to reduce the risk of resuspension of sediments during large storm events. Maintenance is essential for the proper operation of catch basins and oil/water separators.

Recommendations:

- ✓ Work with the community to ensure that storm water runoff instructs away from the well and is treated in accordance with DEP guidance.
- ✓ Additionally, street and parking lot sweeping reduces the amount of potential contaminants in storm runoff.

3. PROTECTION RECOMMENDATIONS

Implementing protection measures and best management practices (BMPs) will reduce the well's susceptibility to contamination. Benjamin Ellis Pre-school should review and adopt the following **key** recommendations above and the following recommendations.

Zone I:

- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Pit installations are not allowed by the Department due to safety concerns associated with confined spaces, as well as the potential for the flooding of the Wellhead that could affect the sanitary quality the water being delivered. The Department recommends that the Wellhead be extended to 18 inches above the final grade of the surface.
- ✓ Consider well relocation if Zone I threats cannot be mitigated.
- ✓ Prohibit public access to the well and pumphouse by locking facilities, gating roads, and posting signs.
- ✓ Conduct regular inspections of the Zone I. Look for illegal dumping, evidence of vandalism.
- ✓ Redirect road and parking lot drainage in the Zone I away from well.
- ✓ Continue to not use or store pesticides, fertilizers or road salt within the Zone I.
- ✓ Work with the Town of Carver to have to the catch basins cleaned on a regular schedule. Additionally, an effective nonstructural source control is street and parking lot sweeping.

The Department's Wellhead Grant Protection Program provides funds to assist public water suppliers in addressing Wellhead protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the 2001 "Wellhead Protection Grant Program". For additional information please refer to the attached program fact for 2001 (Please note each program year the Department posts a new Request for Response for the Grant program (RFR)).

Training and Education:

- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff.
- ✓ Post drinking water protection area signs at key visibility locations.
- ✓ Work with your community to ensure that stormwater runoff is directed away from the well and is treated according to DEP guidance.

Facilities Management:

- ✓ Floor drains in the Zone I and IWPA should be sealed or connected to a sanitary sewer or tight tank.
- ✓ Upgrade all oil/hazardous material storage tanks to incorporate proper containment and safety practices.
- ✓ Implement Best Management Practices (BMPs) for the use of fertilizer, herbicides and pesticides on facility property.

Planning:

- ✓ Work with local officials in Carver to include the Benjamin Ellis Pre-school IWPA in Aquifer Protection District Bylaws and to assist you in improving protection.
- ✓ A gas station, which has USTs containing petroleum hydrocarbons, is located within the IWPA. An UST in IWPA is a concern due to the potential threat posed by the release of its contents if managed improperly.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a potential contaminant threat inventory to assist in setting priorities, focusing inspections, and creating educational activities.
- ✓ These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures.

4. ATTACHMENTS

- Map of the Public Water Supply (PWS) Protection Area.
- Recommended Source Protection Measures Factsheet
- Your Septic System Brochure
- Pesticide Use Factsheet

- Industrial Floor Drains Brochure
- Healthy Schools Fact Sheet
- Wellhead Protection Grant Program Fact Sheet
- Source Protection Sign Order Form
- Massachusetts DEP Oil and Hazardous Materials Incident Report #S92-0961
- Application for Disposal Works Construction Permit